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Presenter: Chadwick V. Jay (oral presentation)

Title: A Remotely Deployed Satellite Transmitter for Walruses

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Abstract: A long-standing problem with aerial surveys of the Pacific walrus is the inability to estimate the proportion of animals hauled out and thus available for sighting (sighting availability). Satellite-linked telemetry is the only viable method for measuring sighting availability in walruses because of their wide distribution, which includes vast areas of broken sea ice. The usual method to attach transmitters to walruses is to capture the animal by chemical immobilization and affix the transmitter to a tusk – the walrus pelage is too thin to glue on the transmitter, as is done for most other pinnipeds. Walrus immobilization is difficult and is especially problematic in sea ice habitats where a darted animal may enter the water and drown upon sedation. In addition, animal capture is time consuming and tusk-mounted transmitters can only be used on older animals with tusks of sufficient size.

An alternative to animal capture is to remotely attach the transmitter with a subdermal anchor using a powerful projector, such as an air gun or crossbow. This would not only eliminate the need for animal capture, but may also make it possible to deploy a relatively large number of transmitters over a shorter period of time and over a wider range of age classes than is possible with tusk-mounted transmitters. Remote tag attachment techniques have been devised for cetaceans with remarkable progress in recent years. However, for these techniques to work on walruses they must be modified, because walrus skin is thicker and tougher and their blubber layer is thinner than cetaceans.

We designed and field tested three types of remotely attached satellite-linked radio transmitters on walruses in sea ice of the southeast Bering Sea in the spring of 2004. One type of tag consisted of a cylindrically shaped transmitter tethered by a flexible line to a flat toggle harpoon head (tethered tag). A second type consisted of a puck-shaped transmitter affixed to one end of a small diameter shaft with a modified whaling toggle harpoon head on the other end of the shaft (fixed tag). The third type of tag was an implantable transmitter consisting of a flat rectangular shaped housing with a cutting blade on one end and broad flexible backward-projecting stainless steel fins on its sides (implanted tag). We deployed twenty of the fixed tags using a crossbow, and ten of the tethered and five of the implanted tags using an air gun.

Because we were unable to observe the tagged walruses after tag deployment, we estimated the minimum duration of tag retention from each animal as the time between tag deployment and the

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last satellite-derived location. Retention to the animal averaged 57, 21, and 23 days for the tethered, implanted, and fixed tags, respectively. Battery voltage was reported in sensor messages from the implanted tags and indicated that the batteries failed in these transmitters before full tag retention was measured. Although the tethered tag was retained for the longest period, it performed much worse than the other tags in transmitting to the satellite, probably because its antenna laid at a much lower angle to the surface of the animal than those of the other tags. All three tag types were successful in reporting the proportion of time individuals hauled out over periods averaging about three weeks, which is close to the duration of data needed for useful estimation of sighting availability of walruses in a proposed aerial survey. We will make further refinements from these tags for additional field tests in 2005.